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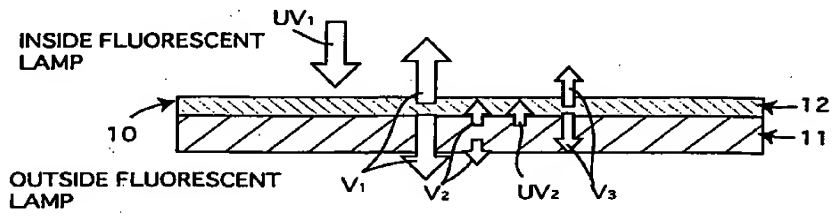
REMARKS

The Office Action indicated that Claim 23 was allowed and that the subject matter of Claim 8 would be allowed if rewritten in independent form. Applicant respectfully requests that the re-writing of dependent Claim 8 be held in abeyance.

The present invention has discovered a relatively economical manner of increasing the luminosity of, for example, a fluorescent lamp over that of conventional designs by increasing the light output by approximately two percent while maintaining the active life of the lamp. More specifically, the present invention has found that by mixing an element from a selected group of emissive oxide elements and adding it to a raw glass material before melting the glass material to make the lamp tube that the inclusion of this emissive element embedded within the glass tube itself provides an advantage in permitting the transmission of the visible light. The emissive element within the glass tube can be excited by a portion of the ultraviolet light to re-emit near-ultraviolet light plus additional visible light from the glass tube. The near ultraviolet light can again strike the phosphorus layer on the inside of the tube to contribute to the emission of additional visible light V3. This is graphically shown in Figure 3 as follows.

FIG.3



The glass tube 11 has a phosphorus layer 12 and more specifically generates the arrows V2 of visible light and also generates UV2 near ultraviolet light which when it again strikes the phosphorus layer 12 produces a secondary emission of visible light V3.

This teaching of the present invention can be compared with that of the *Watanabe et al.* U.S. Patent No. 5,804,483 as shown in Figure 1 wherein a glass tube 2 is simply made of "a soda lime glass which will not pass ultraviolet rays under 300 nm in wavelength." See Column 2, lines 62-64.

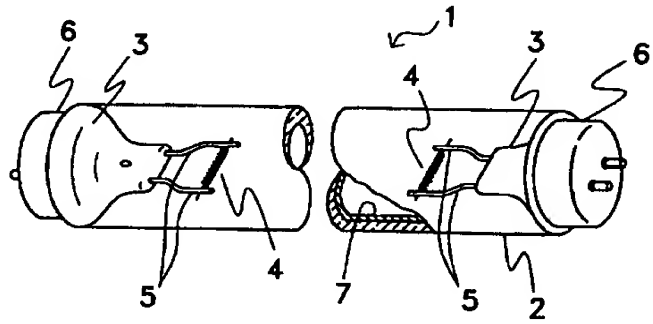


Fig.1

The Office Action erroneously states on page 2 that:

> "The glass tube is made of a glass material (Column 2, line 66) that contains an emissive element."

Actually, Column 2, lines 64-66, states as follows:

> "As an alternative, other light transmitting material can be used for tube, such as fuse silica, ceramic, borosilicate glass, or glass including more than 500 ppm of iron oxide." (Underline added.)

This teaching in the *Watanabe et al.* reference simply states that a light transmitting glass is provided. The inclusion of iron oxide does not create an emissive element as defined in our claims.

The Office Action further compounds this erroneous interpretation by contending that this emissive element, presumably iron oxide or perhaps silica, ceramic, or borosilicate glass is further described in Column 3, line 32. Column 3, line 32, however, describes the elements of a phosphorus layer (7) on an internal surface of the tube (2) as follows:

> "A phosphor layer 7 is coated on the inner surface of the envelope 2. Phosphor layer 7 converts ultraviolet rays of 185 nm and 254 nm emitted from a discharge into visible light and ultraviolet radiation in the wavelength range of 320 nm to 410 nm in the UV-aI and UV-aII regions. Phosphor layer 7 is made of a mixture of four luminescent compounds having peak emissions near 610 nm (red light), 540 nm (green light), 450 nm (blue light) and 370 nm (ultraviolet light), respectively. The luminescent compound emitting red, blue and green are yttrium oxide activated by divalent europium indicated . . ." (Underline added.)

Note, it has already been pointed out that *Watanabe et al.* blocks light of 254 nm as taught on Column 3, lines 62-64, and would teach away from our present invention.

Referring specifically to Claim 1, it is clearly stated that a glass tube has a phosphorus layer formed on an inner surface as one claim element. As another claim element, the glass tube is made of a glass material that contains an emissive element, the emissive element emitting a second ultraviolet light that has a longer wavelength than the first ultraviolet light.

Claim 6 again defines a phosphorus layer on an inner surface with the glass tube made of a glass material containing an oxide of an emissive element. The specific materials that can be used as the emissive element are set forth in the claim. None of these materials are of an iron

oxide nor is there any teaching in the cited reference that would suggest that an iron oxide could perform the purposes of the present invention to increase luminous flux.

The *Watanabe et al.* reference states that the luminous material for providing ultraviolet emissions is the phosphorus layer on the inside of the tube. See for example, Column 5, lines 40-55, wherein a pair of phosphorus layers 21 and 22 are disclosed.

There is no suggestion of adding an emissive element into the glass tube during its manufacturing as utilized in the present invention.

The Office Action again erroneously contends that Column 3, line 35, which refers to a luminous compound emitting red, blue and green of the phosphorus layer 7, is in fact a teaching of each of the emissive elements set forth in our claims.

With regards to independent Claim 12, our present invention defines a phosphorus lamp with a fluorescence tube having a specific protective layer formed on an inner surface. The Office Action, however, cites the teaching at Column 4, line 11, *of Watanabe et al.* as anticipating our present claim. As can be readily appreciated, to anticipate each of the claim elements must be expressly taught in the cited reference. The *Watanabe* reference is referring to a photocatalytic layer 14 coated on an outer surface of the luminaire 11. Our protected layer, as specifically set forth in Claim 12, is on the inner surface of the fluorescence tube and certainly is not anticipated nor even rendered obvious over this teaching.

Claims 15, 18, 19 and 21 were purportedly also anticipated again on a misinterpretation of the phosphorus layer (7) being misconstrued as our emissive element within a glass tube envelope.

In addition, the *Watanabe* reference does not disclose a high intensity discharge lamp with a construction where an envelope surrounds the arc tube.

Finally, the Office Action contended that dependent Claim 4 was rendered obvious over the *Watanabe et al.* reference. As can readily be determined, the independent claim is clearly allowable and accordingly the dependent claim would be also allowable.

The new claims 25-27 provide an alternative definition of our invention and disclose the interaction of the phosphor layer and the embedded emissive element and their relative location to provide the advantage of increasing the visible luminous flux by the addition of the light rays of V2 and V3 as shown in Figure 3 of our drawing. *Watanabe et al.* fails to teach these features.

In summary, it is respectfully submitted that the original indication of allowability of our claims was proper over the *Watanabe et al.* reference since it does not anticipate nor render obvious our present invention. The Office Action has misconstrued the language of our claims by contending that iron oxide within an envelope of a glass tube is equivalent to our UV activated emissive element. This erroneous interpretation is further compounded by contending that a separate phosphorus layer on an interior of the *Watanabe et al.* tube is in essence the same emissive element contained within our glass tube.

It is believed that the present amendment more than adequately supports the patentable features of the claims over the *Watanabe et al.* reference. If the Examiner believes that a telephone interview will help further the prosecution of the present case, the undersigned attorney can be contacted at the listed telephone number.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on October 3, 2003.

By: James Lee

Signature

Dated: October 3, 2003

Respectfully submitted,

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